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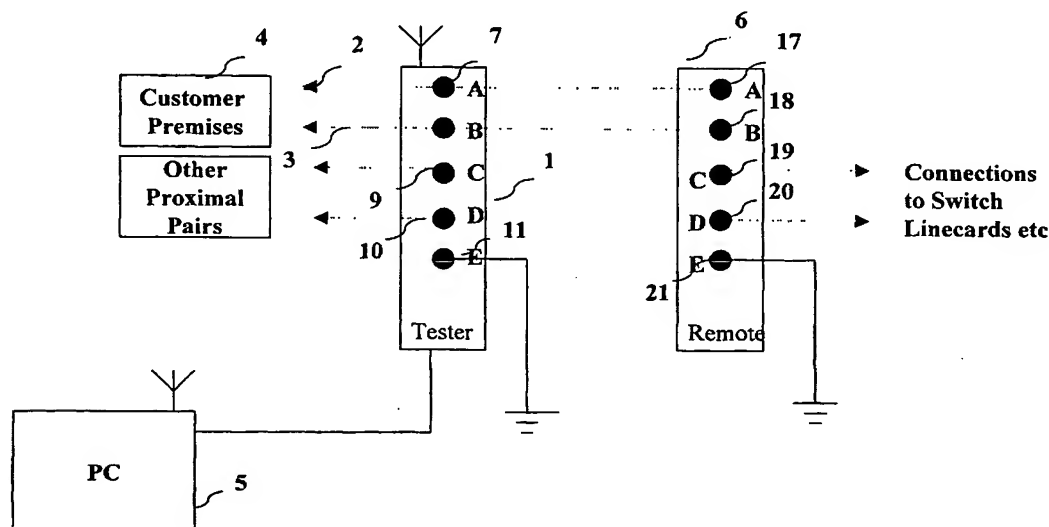
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[Continued on next page]

(54) Title: **LINE TESTING APPARATUS AND METHOD**



(57) Abstract: The line test apparatus includes a PC (5) which stores known line test signature parameters for a number of known fault conditions in which by application of varying signals to a line pair (2,3) under test and capturing parameters during a period in which varying signals are applied to the line via a test head (1), an estimate of the state of the line can be made. A remote unit (6) located at a switch or exchange may also be used to complete the automated scanning of parameters of a line in response to various electrical stimuli. The invention is particularly effective at determining faults which are "dynamic" as well as those which are permanent until repaired.

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B. FIELDS SEARCHED

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 699 402 A (BAUER FRANK R ET AL) 16 December 1997 (1997-12-16) cited in the application	1-7
Y	column 3, line 31 - line 38 column 3, line 57 - line 65 column 4, line 61 - column 5, line 3 column 6, line 45 - column 7, line 5 column 13, line 6 - line 10 column 28, line 15 - line 22 column 28, line 35 - line 39 column 28, line 60 - column 29, line 3 ----- -/--	8-12

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GB2004/001340

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 764 726 A (SCHILLACI ONOFRIO ET AL) 9 June 1998 (1998-06-09)	8-12
A	column 1, line 52 - line 54 column 2, line 44 - line 45 column 3, line 28 - line 35 column 3, line 45 - line 48 column 3, line 56 - line 67 column 4, line 41 - line 44	1-7
A	GB 2 327 553 A (PORTA SYSTEMS CORP) 27 January 1999 (1999-01-27) page 7, line 18 - line 33	1-12
A	US 5 748 098 A (GRACE ANDREW) 5 May 1998 (1998-05-05) column 2, line 59 - column 3, line 4	1-12

INTERNATIONAL SEARCH REPORT

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5699402	A	16-12-1997	BR 9509197 A	21-10-1997
			CZ 9700891 A3	13-08-1997
			EP 0783813 A2	16-07-1997
			SK 39797 A3	05-11-1997
			WO 9610890 A2	11-04-1996
			US 6026145 A	15-02-2000
			US 5870451 A	09-02-1999
US 5764726	A	09-06-1998	US 5521958 A	28-05-1996
			AU 697770 B2	15-10-1998
			AU 2358995 A	29-11-1995
			BR 9506015 A	19-08-1997
			CA 2166396 A1	09-11-1995
			CN 1129052 A , B	14-08-1996
			DE 69525408 D1	21-03-2002
			DE 69525408 T2	10-10-2002
			EP 0706737 A1	17-04-1996
			NZ 284907 A	29-01-1997
			WO 9530298 A1	09-11-1995
			US 5583912 A	10-12-1996
			US 5528660 A	18-06-1996
			US 5533093 A	02-07-1996
			US 5703929 A	30-12-1997
GB 2327553	A	27-01-1999	AU 6580798 A	22-10-1998
			CA 2285239 A1	08-10-1998
			EP 0972252 A1	19-01-2000
			WO 9844428 A1	08-10-1998
			US 6636841 B1	21-10-2003
US 5748098	A	05-05-1998	AU 671194 B2	15-08-1996
			AU 6111794 A	14-09-1994
			CA 2154585 A1	01-09-1994
			CN 1121384 A , B	24-04-1996
			DE 69410447 D1	25-06-1998
			DE 69410447 T2	08-10-1998
			DK 686336 T3	18-01-1999
			EP 0686336 A1	13-12-1995
			ES 2117255 T3	01-08-1998
			WO 9419912 A1	01-09-1994
			HK 1011162 A1	02-07-1999
			JP 2823698 B2	11-11-1998
			JP 8506947 T	23-07-1996
			SG 47696 A1	17-04-1998